CLAIMS

1. An image processing apparatus comprising:

extracting means for extracting a feature region from a region of an object in image, in accordance with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel;

calculating means for calculating a gravity-center correlation value that shows the correlation between the gravity center of the feature region and the gravity center of the image region of the object; and

determining means for determining an orientation of the object from the gravity-center correlation value.

2. The image processing apparatus according to claim 1, wherein the extracting means includes:

pixel extracting means for extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

dynamic range calculating means for calculating the dynamic range of the pixels; and

feature region extracting means for extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

3. The image processing apparatus according to claim 1, wherein the determining

means determines the orientation of the object, in accordance with the relation information that shows a relation between the gravity-center correlation value and the orientation of the object.

4. The image processing apparatus according to claim 1, wherein the calculating means calculates the gravity-center correlation value in accordance with the difference between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

5. An image processing apparatus comprising:

extracting means for extracting a feature region from an image region of an object, in accordance with a luminance distribution of pixels adjacent to a predetermined pixel;

classifying means for classifying each pixel existing in the feature region into one of classes;

distribution table generating means for generating an objective frequency distribution table which shows a frequency distribution of pixels in each class; and

determining means for determining an orientation of the object in accordance with the objective frequency distribution table.

6. The image processing apparatus according to claim 5, wherein the extracting means includes:

pixel extracting means for extracting a plurality of pixels for detecting a dynamic range from the image region of the object, in accordance with the position

of the predetermined pixel existing in the image region of the object;

dynamic range calculating means for calculating the dynamic range of the extracted pixels; and

feature region extracting means for extracting the predetermined pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

7. The image processing apparatus according to claim 5, wherein the determining means includes:

gravity-center calculating means for calculating the gravity center of a region of pixels which are classified by the classifying means, in each class;

object gravity-center calculating means for calculating a gravity-center value of the image region of the object;

gravity-center correlation calculating means for calculating a gravity-center correlation value in each class, which value shows correlation between the gravity center of the feature region and the image region of the object; and

orientation determining means for determining an orientation of the object, in accordance with the gravity-center correlation value in each class and the objective frequency distribution table.

8. The image processing apparatus according to claim 7, wherein the orientation determining means calculates the gravity-center correlation value and a frequency of the objective distribution table in each class and preset weight coefficients, and detects the orientation of the object by adding the results of calculating.

9. The image processing apparatus according to claim 8, wherein the operation is performed in accordance with the following equation:

$$angle = \sum_{i}^{class\ number} (weight\ coefficient)_i \times (gravity - center\ correlation\ value)_i \times (frequency)_i$$

10. The image processing apparatus according to claim 8, wherein the operation is performed in accordance with the following equation:

$$angleV = \sum_{i}^{class\ number} (W_{i1}, W_{i2}, W_{i3}, W_{i4}, W_{i5}, W_{i6}, W_{i7}) \times (C_i \times D_i, 1/(C_i \times D_i), D_i, C_i, 1/D_i, 1/C_i, 1)$$

where w_{ij} is the weight coefficient for each class i (j is an integer), C_i is the gravity-center correlation value, Di is the frequency.

11. The image processing apparatus according to claim 5, wherein the determining means includes:

storage means for storing a reference frequency distribution table which shows a frequency of pixels in the feature region on each class in a representative orientation;

frequency-distribution correlation value generating means for generating a frequency distribution correlation value which shows a correlation between the objective frequency distribution table and the reference frequency distribution table; and

orientation determining means for determining an orientation of the object in accordance with the frequency distribution correlation value.

12. The image processing apparatus according to claim 11, wherein the orientation determining means includes:

data storage means for storing orientation information which shows a relation between the orientation of the object and the frequency distribution correlation value; and

correlation-utilized orientation-determining means for determining the orientation of the object in accordance with the frequency distribution correlation value, by referring to the orientation information.

13. The image processing apparatus according to claim 5, wherein the determination means includes:

storage means for storing a frequency distribution table which shows a frequency of pixels in the feature region in each class in each of a plurality of representative orientation;

frequency-distribution correlation value generating means for generating frequency distribution correlation values which show the correlations between each objective frequency distribution table and the reference frequency distribution table; and

orientation determining means for determining an orientation of the object in accordance with the frequency distribution correlation values.

14. The image processing apparatus according to claim 13, wherein the orientation determining means includes:

data storage means for storing orientation information which shows relation between the orientation of the object and each of the frequency distribution correlation value of each representative orientation; and

correlation-utilizing orientation-determining means for determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information for determining an orientation.

15. The image processing apparatus according to claim 13, wherein the orientation determining means includes:

data storage means for storing orientation information which shows relation between the orientations of the object and the frequency distribution correlation values; and

correlation-utilizing orientation-determining means for determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information for determining an orientation.

16. An image processing apparatus comprising:

determining means for determining an orientation of an object;

extracting means for extracting a feature region from a region of an object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel existing in each image;

calculating means for calculating a gravity-center correlation value that shows

the correlation between the gravity center of the feature region and the gravity center of the region of the object in each image; and

generating means for generating relation information which shows the relation between the gravity-center correlation value and an orientation of the object.

17. The image processing apparatus according to claim 16, wherein the extracting means includes:

pixel extracting means for extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

dynamic range calculating means for calculating the dynamic range of the pixels; and

feature region extracting means for extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

18. The image processing apparatus according to claim 16, wherein the calculating means calculates the gravity-center correlation value in accordance with the difference between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

19. An image processing apparatus comprising:

determining means for determining an orientation of an object;

extracting means for extracting a feature region from a image region of the

object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels corresponding to an predetermined pixel existing in each image;

classifying means for classifying each pixel existing in the feature region, into one of classes;

distribution generating means for generating a reference frequency distribution table which is a frequency distribution of a number of pixels, which are classified in the classifying means, in each class;

gravity-center calculating means for calculating a gravity center of an image region consisting of pixels in each class, which pixels are classified in the classifying means;

object gravity-center calculating means for calculating a gravity center of the image region of the object;

gravity-center correlation calculating means for calculating a gravity-center correlation value that shows correlation between the gravity center of the feature region and the gravity center of the region of the object in each class; and

relation information calculating means for calculating relation information values in accordance with the gravity-center correlation information value of each class, the reference frequency distribution table and the orientation of the object.

20. The image processing apparatus according to claim 19, wherein the extracting means includes:

pixel extracting means for extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

dynamic range calculating means for calculating the dynamic range of the pixels; and

feature region extracting means for extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

21. The image processing apparatus according to claim 19, wherein the operation is performed in accordance with the following equation:

$$angle = \sum_{i}^{class\ number} (weight\ coefficient)_i \times (gravity - center\ correlation\ value)_i \times (frequency)_i$$

22. The image processing apparatus according to claim 19, wherein the operation is performed in accordance with the following equation:

$$angleV = \sum_{i}^{class\ number} (W_{i1}, W_{i2}, W_{i3}, W_{i4}, W_{i5}, W_{i6}, W_{i7}) \times (C_i \times D_i, 1/(C_i \times D_i), D_i, C_i, 1/D_i, 1/C_i, 1)$$

where w_{ij} is the weight coefficient for each class i (j is an integer), C_i is the gravity-center correlation value, D_i is the frequency.

23. An image processing apparatus comprising:

acquiring means for acquiring images of an orientation of an object, in

association with information about an orientation of the object;

extracting means for extracting a feature region from the image region of the object, for the orientation data, in accordance with a luminance distribution of a plurality of pixels corresponding to a predetermined pixel;

classifying means for classifying each pixel existing in the feature region into one of classes;

distribution table generating means for generating a frequency distribution table of a number of pixels, which pixels are classified in the classifying means, in each class;

correlation generating means for generating a frequency-distribution correlation value that shows correlation between one distribution table called a reference histogram and at least one of the other distribution tables called objective histograms, which distribution tables are generated in the distribution generating means; and

relation information generating means for generating relation information which shows relation between the frequency distribution correlation value and the orientation information.

24. The image processing apparatus according to claim 23, wherein the reference histogram is generated in accordance with the images corresponding to representative orientations of a plurality of orientations.

25. An image processing method comprising the steps of:

extracting a feature region from a region of an object in image, in accordance

with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel;

calculating a gravity-center correlation value that shows the correlation between the gravity center of the feature region and the gravity center of the image region of the object; and

determining an orientation of the object from the gravity-center correlation value.

26. The image processing method according to claim 25, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the pixels; and

a predetermined pixel extracting step of extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

27. The image processing method according to claim 25, wherein the orientation of the object is determined in accordance with the relation information that shows a relation between the gravity-center correlation value and the orientation of the object.

28. The image processing method according to claim 25, wherein the gravity-center correlation value is calculated in accordance with the difference

between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

29. An image processing method comprising the steps of:

extracting a feature region from an image region of an object, in accordance with a luminance distribution of pixels adjacent to a predetermined pixel;

classifying each pixel included in the feature region into one of classes;

generating an objective frequency distribution table which shows a frequency distribution of pixels in each class; and

determining an orientation of the object in accordance with the objective frequency distribution table.

30. The image processing method according to claim 29, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region of the object, in accordance with the position of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the extracted pixels; and

a feature region extracting step for extracting the predetermined pixel in the feature region, when the dynamic range is greater than a predetermined value.

31. The image processing method according to claim 29, wherein the determining step includes:

a gravity-center calculating step of calculating the gravity center of a region of pixels which are classified, in each class;

an object-region gravity-center calculating step of calculating a gravity-center value of the image region of the object;

a gravity-center correlation calculating step of calculating a gravity-center correlation value in each class, which value shows correlation between the gravity center of the feature region and the image region of the object; and

an orientation determining step of determining an orientation of the object, in accordance with the gravity-center correlation value in each class and the objective frequency distribution table.

32. The image processing method according to claim 30, wherein in the orientation determining step calculates the gravity-center correlation value and a frequency of the objective distribution table in each class are calculated, weight coefficients are preset, and the orientation of the object is detected by adding the results of calculating.

33. The image processing method according to claim 32, wherein the operation is performed in accordance with the following equation:

$$angle = \sum_{i}^{class\ number} (weight\ coefficient)_i \times (gravity - center\ correlation\ value)_i \times (frequency)_i$$

34. The image processing method according to claim 32, wherein the operation is performed in accordance with the following equation:

$$angleV = \sum_{i}^{class\ number} \left(W_{i1}, W_{i2}, W_{i3}, W_{i4}, W_{i5}, W_{i6}, W_{i7}\right) \times \left(C_i \times D_i, 1/\left(C_i \times D_i\right), D_i, C_i, 1/D_i, 1/C_i, 1\right)$$

where w_{ij} is the weight coefficient for each class i (j is an integer), C_i is the gravity-center correlation value, D_i is the frequency.

35. The image processing method according to claim 29, wherein the determining step includes:

a frequency-distribution correlation value generating step of generating a frequency distribution correlation value which shows a correlation between the objective frequency distribution table and the reference frequency distribution table which shows a frequency of pixels in the feature region on each class in a representative orientation; and

an orientation determining step of determining an orientation of the object in accordance with the frequency distribution correlation value.

36. The image processing method according to claim 35, wherein the orientation determining step includes:

a correlation-utilized orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation value, by referring to the orientation information which shows a relation between the orientation of the object and the frequency distribution correlation value.

37. The image processing method according to claim 29, wherein the determination

step includes:

a frequency-distribution correlation value generating step of generating frequency distribution correlation values which show the correlations between each objective frequency distribution table and the reference frequency distribution table which shows a frequency of pixels in the feature region in each class in each of a plurality of representative orientation; and

an orientation determining step of determining an orientation of the object in accordance with the frequency distribution correlation values.

38. The image processing method according to claim 37, wherein the orientation determining step includes:

a correlation-utilizing orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information which shows relation between the orientation of the object and each of the frequency distribution correlation value of each representative orientation for determining an orientation.

39. The image processing method according to claim 37, wherein the orientation determining step includes:

a correlation-utilizing orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information which shows relation between the orientations of the object and the frequency distribution correlation values for

determining an orientation.

40. An image processing method comprising the steps of:

determining an orientation of an object;

extracting a feature region from a region of an object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel existing in each image;

calculating a gravity-center correlation value that shows the correlation between the gravity center of the feature region and the gravity center of the region of the object in each image; and

generating relation information which shows the relation between the gravity-center correlation value and an orientation of the object.

41. The image processing method according to claim 40, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the pixels; and

a feature region extracting step of extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined

value.

42. The image processing method according to claim 40, wherein in the calculating step, the gravity-center correlation value is calculated in accordance with the difference between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

43. An image processing method comprising the steps of:

determining an orientation of an object;

extracting a feature region from a image region of the object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels corresponding to an predetermined pixel existing in each image;

classifying each pixel existing in the feature region, into one of classes;

generating a reference frequency distribution table which is a frequency distribution of a number of pixels, which are classified in the classifying step, in each class;

calculating a gravity center of an image region consisting of pixels in each class, which pixels are classified in the classifying step;

calculating a gravity center of the image region of the object;

calculating a gravity-center correlation value that shows correlation between the gravity center of the feature region and the gravity center of the region of the object in each class; and

calculating relation information values in accordance with the gravity-center correlation information value of each class, the reference frequency distribution table and the orientation of the object.

44. The image processing method according to claim 43, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the pixels; and

a feature region extracting step of extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

45. The image processing method according to claim 44, wherein the operation is performed in accordance with the following equation:

$$angle = \sum_{i}^{class\ number} (weight\ coefficient)_i \times (gravity - center\ correlation\ value)_i \times (frequency)_i$$

46. The image processing method according to claim 44, wherein the operation is performed in accordance with the following equation:

$$angleV = \sum_{i}^{class\ number} \left(W_{i1}, W_{i2}, W_{i3}, W_{i4}, W_{i5}, W_{i6}, W_{i7}\right) \times \left(C_i \times D_i, 1/\left(C_i \times D_i\right), D_i, C_i, 1/D_i, 1/C_i, 1\right)$$

where w_{ij} is the weight coefficient for each class i (j is an integer), C_i is the gravity-center correlation value, D_i is the frequency.

47. An image processing method comprising the steps of:

acquiring images of an orientation of an object, in association with information about an orientation of the object;

extracting a feature region from the image region of the object, for the orientation data, in accordance with a luminance distribution of a plurality of pixels corresponding to a predetermined pixel;

classifying each pixel existing in the feature region into one of classes;

generating a frequency distribution table of a number of pixels, which pixels are classified in the classifying step, in each class;

generating a frequency-distribution correlation value that shows correlation between one distribution table called a reference histogram and at least one of the other distribution tables called objective histograms, which distribution tables are generated in the distribution generating step; and

generating relation information which shows relation between the frequency distribution correlation value and the orientation information.

48. The image processing method according to claim 47, wherein the reference

histogram is generated in accordance with the images corresponding to representative orientations of a plurality of orientations.

49. A recording medium for storing a computer-controllable program, said computer-controllable program comprising the steps of:

extracting a feature region from a region of an object in image, in accordance with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel;

calculating a gravity-center correlation value that shows the correlation between the gravity center of the feature region and the gravity center of the image region of the object; and

determining an orientation of the object from the gravity-center correlation value.

50. The recording medium according to claim 49, which stores a computer-controllable program, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region, in accordance with the position of the pixel of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the pixels; and

a predetermined pixel extracting step of extracting the predetermined pixel as a pixel existing in the feature region, when the dynamic range is greater than a predetermined value.

51. The recording medium according to claim 49, which stores a computer-controllable program, wherein the gravity-center correlation value is calculated in accordance with the difference between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

52. The recording medium according to claim 49, which stores a computer-controllable program, wherein the gravity-center correlation value is calculated in accordance with the difference between a position of the gravity center of the feature region and the position of the gravity center of the image region of the object.

53. A recording medium for storing a computer-controllable program, said computer-controllable program comprising the steps of:

extracting a feature region from an image region of an object, in accordance with a luminance distribution of pixels adjacent to a predetermined pixel;

classifying each pixel included in the feature region into one of classes;

generating an objective frequency distribution table which shows a frequency distribution of pixels in each class; and

determining an orientation of the object in accordance with the objective frequency distribution table.

54. The recording medium according to claim 53, which stores a computer-controllable program, wherein the extracting step includes:

a pixel extracting step of extracting a plurality of pixels for detecting a dynamic range from the image region of the object, in accordance with the position of the predetermined pixel existing in the image region of the object;

a dynamic range calculating step of calculating the dynamic range of the extracted pixels; and

a feature region extracting step for extracting the predetermined pixel in the feature region, when the dynamic range is greater than a predetermined value.

55. The recording medium according to claim 53, which stores a computer-controllable program, wherein the determining step includes:

a gravity-center calculating step of calculating the gravity center of a region of pixels which are classified, in each class;

an object-region gravity-center calculating step of calculating a gravity-center value of the image region of the object;

a gravity-center correlation calculating step of calculating a gravity-center correlation value in each class, which value shows correlation between the gravity center of the feature region and the image region of the object; and

an orientation determining step of determining an orientation of the object, in accordance with the gravity-center correlation value in each class and the objective frequency distribution table.

56. The recording medium according to claim 55, which stores a computer-controllable program, wherein in the orientation determining step calculates

the gravity-center correlation value and a frequency of the objective distribution table in each class are calculated, weight coefficients are preset, and the orientation of the object is detected by adding the results of calculating.

57. The recording medium according to claim 56, which stores a computer-controllable program, wherein the operation is performed in accordance with the following equation:

$$angle = \sum_{i}^{class\ number} (weight\ coefficient)_i \times (gravity - center\ correlation\ value)_i \times (frequency)_i$$

58. The recording medium according to claim 56, which stores a computer-controllable program, wherein the operation is performed in accordance with the following equation:

$$angleV = \sum_{i}^{class\ number} (W_{i1}, W_{i2}, W_{i3}, W_{i4}, W_{i5}, W_{i6}, W_{i7}) \times (C_i \times D_i, 1/(C_i \times D_i), D_i, C_i, 1/D_i, 1/C_i, 1)$$

where w_{ij} is the weight coefficient for each class i (j is an integer), C_i is the gravity-center correlation value, D_i is the frequency.

59. The recording medium according to claim 56, which stores a computer-controllable program, wherein the determining step includes:

a frequency-distribution correlation value generating step of generating a frequency distribution correlation value which shows a correlation between the objective frequency distribution table and the reference frequency distribution table

which shows a frequency of pixels in the feature region on each class in a representative orientation; and

an orientation determining step of determining an orientation of the object in accordance with the frequency distribution correlation value.

60. The recording medium according to claim 59, which stores a computer-controllable program, wherein the orientation determining step includes:

a correlation-utilized orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation value, by referring to the orientation information which shows a relation between the orientation of the object and the frequency distribution correlation value.

61. The recording medium according to claim 53, which stores a computer-controllable program, wherein the determination step includes:

a frequency-distribution correlation value generating step of generating frequency distribution correlation values which show the correlations between each objective frequency distribution table and the reference frequency distribution table which shows a frequency of pixels in the feature region in each class in each of a plurality of representative orientation; and

an orientation determining step of determining an orientation of the object in accordance with the frequency distribution correlation values.

62. The recording medium according to claim 61, which stores a computer-controllable program, wherein the orientation determining step includes:

a correlation-utilizing orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information which shows relation between the orientation of the object and each of the frequency distribution correlation value of each representative orientation for determining an orientation.

63. The recording medium according to claim 61, which stores a computer-controllable program, wherein the orientation determining step includes:

a correlation-utilizing orientation-determining step of determining the orientation of the object in accordance with the frequency distribution correlation values, by referring to the orientation information which shows relation between the orientations of the object and the frequency distribution correlation values for determining an orientation.

64. A recording medium for storing a computer-controllable program, said computer-controllable program comprising the steps of:

determining an orientation of an object;

extracting a feature region from a region of an object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels adjacent to a predetermined pixel existing in each image;

calculating a gravity-center correlation value that shows the correlation between the gravity center of the feature region and the gravity center of the region

of the object in each image; and

generating relation information which shows the relation between the gravity-center correlation value and an orientation of the object.

65. A recording medium for storing a computer-controllable program, said computer-controllable program comprising the steps of:

determining an orientation of an object;

extracting a feature region from a image region of the object in each image which corresponds to an orientation of the object, in accordance with a luminance distribution of a plurality of pixels corresponding to an predetermined pixel existing in each image;

classifying each pixel existing in the feature region, into one of classes;

generating a reference frequency distribution table which is a frequency distribution of a number of pixels, which are classified in the classifying step, in each class;

calculating a gravity center of an image region consisting of pixels in each class, which pixels are classified in the classifying step;

calculating a gravity center of the image region of the object;

calculating a gravity-center correlation value that shows correlation between the gravity center of the feature region and the gravity center of the region of the object in each class; and

calculating relation information values in accordance with the gravity-center

correlation information value of each class, the reference frequency distribution table and the orientation of the object.

66. A recording medium for storing a computer-controllable program, said computer-controllable program comprising the steps of:

acquiring images of an orientation of an object, in association with information about an orientation of the object;

extracting a feature region from the image region of the object, for the orientation data, in accordance with a luminance distribution of a plurality of pixels corresponding to a predetermined pixel;

classifying each pixel existing in the feature region into one of classes;

generating a frequency distribution table of a number of pixels, which pixels are classified in the classifying step, in each class;

generating a frequency-distribution correlation value that shows correlation between one distribution table called a reference histogram and at least one of the other distribution tables called objective histograms, which distribution tables are generated in the distribution generating step; and

generating relation information which shows relation between the frequency distribution correlation value and the orientation information.

67. The recording medium according to claim 66, which stores a computer-controllable program, wherein the reference histogram is generated in accordance with the images corresponding to representative orientations of a plurality

of orientations.